Marine Biological Laboratory
LIBRARY
APR 28 1988
Woods Hole, Mass.

PROCEEDINGS
OF THE
CALIFORNIA ACADEMY OF SCIENCES

Vol. 45, No. 11, pp. 267-276, 8 figs. April 12, 1988

STUDIES ON THE ZOARCIDAE (TELEOSTEI: PERCIFORMES) OF THE SOUTHERN HEMISPHERE. II. TWO NEW GENERA AND A NEW SPECIES FROM TEMPERATE SOUTH AMERICA

By

M. Eric Anderson

Department of Ichthyology, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118

ABSTRACT: Comparative osteological studies of two South American zoarcid fishes revealed both to be distinctive, primitive lycenchelyines, as defined by Anderson (1984). *Maynea microphthalma* (Norman, 1937) and *Letholycus magellanicus* sp. nov., comprise the new genus *Letholycus*, distinguished by reduction of its chain of suborbital bones, gill slit, palatal arch, pectoral fin, vertebral number, and pelvic fin loss. *Ophthalmolycus stehmanni* Gosztonyi, 1977, comprises the new, monotypic genus *Plesienchelys*, distinguished by its anteriorly broadened pterotic bones, open preoperculomandibular canal, uniquely tapering tail, and few vertebrae. Both genera are endemic to the upper continental slope off Argentina.

RESUMEN: Estudios osteólogicos comparativos de dos especies de peces zoarcidos de Sur America revelan que ambos han de ser distintivos de tipos primitivos lycenchelyinos de Anderson (1984). *Maynea microphthalma* (Norman, 1937) y *Letholycus magellanicus* sp. nov., comprende el género *Letholycus*, distinguido por su redocido cadena de huesos suborbitales, abertura branquial, arco paladial, aleta pectoral, numera de vertebras, y la perdida de la aleta pelvica. *Ophthalmolycus stehmanni* Gosztonyi, 1977 comprende un tipo único en el género *Plesienchelys*, distinguido por sus anchos huesos pteróticos, canal preoperculomandibular abierta, cola de terminación angular única, y pocas vertebras. Los dos géneros son endemicos a la parte alta de la pendiente continental de las costas argentinas.

Received May 20, 1987. Accepted August 19, 1987.

INTRODUCTION

In his review of temperate South American Zoarcidae, the first since Norman (1937), Gosztonyi (1977) added three new genera and five new species to this fauna for a total of 20 species. The addition of three distinctive genera indicated that the zoarcid fauna of this area (Magellan Province of Briggs 1974) may be more speciose than previously thought. Gosztonyi's new material came from littoral collections made by himself and colleagues, and from exploratory fishing operations of the Federal Republic of Germany's Institut für Seefischerei, Hamburg (ISH).

I have recently studied the ISH collections, including material obtained since 1977. My studies have been greatly enhanced by previously unreported collections of the U.S. Antarctic Research Program from the Magellan Province housed at the Los Angeles County Museum of Natural History (LACM) as well as material collected by Soviet colleagues housed at the Zoological Institute in Leningrad (ZIL). I have reported on these collections from Antarctica elsewhere (Anderson, in press).

Norman (1937) described *Melanostigma microphthalmus* from the 1928 WILLIAM SCORESBY collections off the Falkland Islands.

The species was placed in *Maynea* Cunningham, 1871, by McAllister and Rees (1964) and Gosztonyi (1977), but the anatomy of this rare form was unknown to these authors. The new ISH collections include a specimen that I was able to dissect and partially clear and stain, revealing its distinctive, reduced skeleton. Two other specimens were found, at first identified as *M. microphthalmus,* but on closer inspection were discovered to be a second, closely related species. Both forms comprise the new genus *Letholycus* described here and contrasted with *Maynea,* recently redescribed (Anderson, 1988).

Gosztonyi (1977) described *Ophthalmolycus stehmanni* from a single specimen taken during the 1971 WALTHER HERWIG cruise north of the Falkland Islands. Although Gosztonyi was able to compare his specimen with the then only known specimen of the type species of *Ophthalmolycus* Regan, 1913 (*Lycodes macrops* Günther, 1880), the osteology of these two forms remained unknown. I have examined six additional specimens each of *O. macrops* and *O. stehmanni* from the ISH and LACM collections, and made osteological observations on each species. As a result, the new genus *Plesienchelys* is herein erected for *O. stehmanni.*

Methods and Materials

Measurements were made with ocular micrometer or dial calipers to the nearest 0.1 mm. Osteological observations were made on cleared and stained specimens (Dingerkus and Uhler 1977) and drawings made with the aid of a camera lucida. Definitions of characters and measurements follow those of Gosztonyi (1977) and Anderson (1982, 1984), repeated in the first part of this series (Anderson, in press). Character state modifiers are based on those numerically scored characters of Anderson (1984). Museum abbreviations follow Leviton et al. (1985).

Abbreviations for bone names used in the text figures are as follows:

act—actinosts
ang—anguloarticular
basbr—basibranchial
br—branchiostegal ray
cerbr—ceratobranchial
cerhy—ceratohyal
cl—cleithrum
cor—coracoid
ect—ectopterygoid
epibr—epibranchial
epihy—epihyal
ex—lateral extrascapular
exoc—exoccipital
fr—frontal
hyom—hyomandibula
hypbr—hypobranchials
hyphy—hypohyal
i2–4—infrapharyngobranchials
inthy—interhyal
lat eth—lateral ethmoid
max—maxilla
mep—mesopterygoid
mes—mesethmoid
pal—palatine
pas—parasphenoid
pcl—postcleithrum
pel—pelvic (basipterygium)
pop—preopercle
ptem—posttemporal
pto—pterotic
pts—pterosphenoid
quad—quadrate
scap—scapula
soc—supraoccipital
sph—sphenotic
supcl—supracleithrum
urohy—urohyal

Plesienchelys gen. nov.

Type Species.—*Ophthalmolycus stehmanni* Gosztonyi, 1977.

Diagnosis.—A lycencnelyine zoarcid as defined by Anderson (1984) with body slender, tail relatively elongate; anterior portion of pterotic bones wider than posterior portion; preoperculomandibular canal passing through trough in preopercle and dentary; palatal arch well developed, with ectopterygoid and mesopterygoid overlapping more than half anterior and dorsal surfaces of quadrate; vertebrae 19–21 + 66–73 = 86–93; tail sharply tapering posteriorly; pyloric caeca absent. Other characters those of single species.

Etymology.—From the Greek πλείων, majority (used as primitive in zoology), and ἔγχελυς, eel; combination refers to this taxon's many primitive characters. Gender: feminine.

Plesienchelys stehmanni (Gosztonyi, 1977)

(Fig. 1A, 2, 3, 4A, 5A, 6A)

Ophthalmolycus stehmanni Gosztonyi, 1977:230–233, fig. 16, 17.

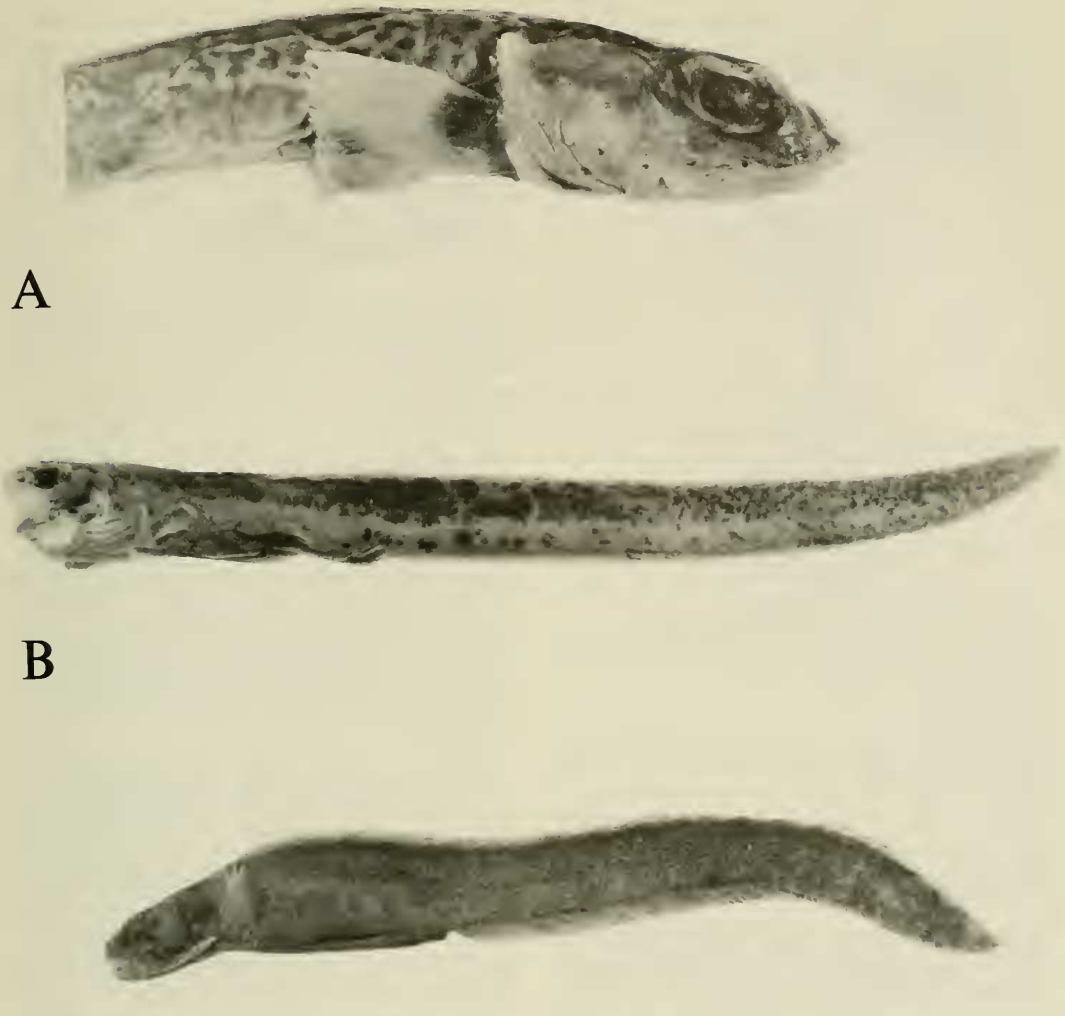

FIGURE 1. Lateral views of: A) *Plesienchelys stehmanni,* head and trunk, ISH 377/78, 204 mm; B) *Letholycus microphthalmus,* ISH 376/78, 90 mm; C) *Letholycus magellanicus,* holotype, ISH 164/78, 147 mm.

MATERIAL EXAMINED.—ISH 317/71 (holotype; 165 mm SL); north of Falkland Isls. (49°13′S, 58°45′W); FFS WALTHER HERWIG (WH) sta. 294/71; 485–506 m; 14 Feb. 1971. ISH 249/78 (1; 193 mm, cleared and stained); north of Falkland Isls. (49°30.7′S, 57°34.8′W); WH sta. 634/71; 340–345 m; 13 June 1978. ISH 377/78 (1; 202 mm); Argentine slope (40°15.9′S, 56°07.7′W); WH sta. 719/78; 975 m; 21 July 1978. ISH 383/71 (1; 247 mm); south of Falkland Isls. (52°57.0′S, 58°30.2′W); WH sta. 825/78; 465 m; 20 Aug. 1978. ISH 392/78 (1; 216 mm); off Rio de la Plata (37°33.2′S, 54°25.2′W); WH sta. 928/78; 847 m; 28 Sept. 1978. ISH 393/78 (1; 205 mm); Argentine slope (47°51.5′S, 59°33.0′W); WH sta. 982/78; 840 m; 9 Oct. 1978. LACM 10449-2 (1; 232 mm); east of Falkland Isls. (51°58′S, 56°38′W); ELTANIN sta. 558; 646–845 m; 14 Mar. 1963.

COUNTS AND MEASUREMENTS.—Vertebrae 19–21 + 66–73 = 86–93; D 80–86; A 68–77; C 9–10; P1 17–19; P2 three; vomerine teeth three to eight; palatine teeth three to seven; gill rakers 1–3 + 7–9 = 8–11; branchiostegal rays six; pseudobranch filaments one to five; pyloric caeca absent. Following measurements in percent SL: head length 15.9–17.6; pectoral fin length 8.0–9.8; predorsal length 20.6–21.8; preanal length 31.7–35.2; body height 5.1–6.6; caudal fin length 2.4–5.4. Following measurements in percent HL: head width 47.9–58.4; upper jaw length 44.1–56.4; pectoral fin length 46.2–53.6; pelvic fin length 13.3–18.4; snout length 21.1–27.3; eye diameter 28.9–37.3; gill slit length 35.7–42.9; interorbital width 6.9–8.8. Pectoral base/length ratio 47.1–58.9.

DIAGNOSIS.—As for genus.

DESCRIPTION.—Head relatively large; dorsal

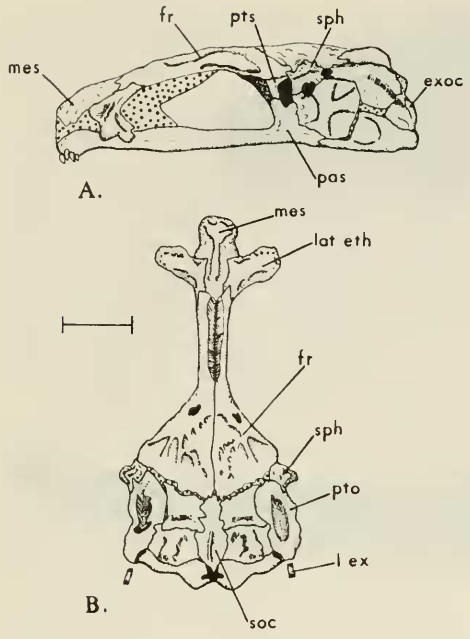

FIGURE 2. Neurocranium of *Plesienchelys stehmanni*, ISH 249/78: A) left lateral view; B) dorsal view. Bar = 5 mm.

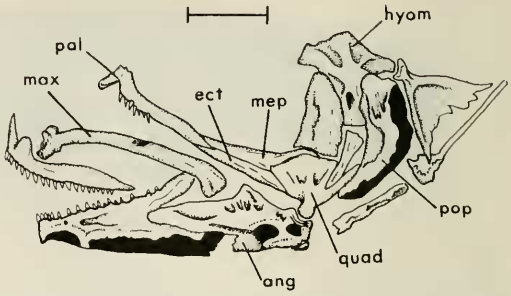

FIGURE 3. Jaws, suspensorium, and opercular bones of *Plesienchelys stehmanni*, ISH 249/78, left lateral view. Bar = 5 mm.

profile, when viewed laterally, gently curved, steeper anteriorly; ventral profile straight. Body relatively short, ovoid in cross section, profile evenly tapering. Tail laterally compressed, especially posteriorly; anterior region of tail gradually tapering, but posterior portion thinned to fine point, appearing as sharp spike when viewed laterally (Gosztonyi 1977, fig. 16). Skin moderately firm, thin, with subdermal gelatinous layer covering head and body, this not present on tail. Body lateral line with mediolateral branch running to middle of tail and ventrolateral branch running to tail tip. Scales minute, cycloid, imbedded, extending anteriorly on tail to about one head length or less posterior to anus, formed into wedge-shaped pattern anteriorly; very few scales extend onto bases of dorsal and anal fins. Eye relatively large, ovoid, comparatively larger in smaller specimens. Gill opening nearly vertical dorsally, extending ventrally to near pelvic base; no siphonal fold formed at dorsal margin. Single pair of nostrils at snout tip, nasal tube minute, not reaching upper lip. Posterior margin of pectoral fin evenly rounded, relatively large, origin just below body midline, insertion on ventral surface of abdomen; ventralmost seven to eight rays thickened, excised at tips.

Mouth moderately large, subterminal; upper jaw 49.1–56.4% HL in adult males, 44.1–47.1% HL in adult females (no young juveniles of this species are known). Teeth in jaws and palate small, conical; females with more and smaller teeth than similarly sized males. Outer, anterior teeth in premaxilla slightly larger than those of inner rows in males, but not in females; outer dentary teeth same size as those of inner rows in both sexes.

Cephalic lateralis pore system reduced numerically, pores very small, rounded. One or two pairs of nasal pores, anteriormost present when only one (single pair on each side in four specimens, two pair in two specimens, and one right, two left pores in one). First, third, and fourth postorbital pores present, emanating from frontals (first) and lateral extrascapulars. Interorbital and occipital (supratemporal) pores absent, no supratemporal commissure across parietals. Preoperculomandibular canal with four dentary, one anguloarticular, and three preopercular pores. Seven suborbital bones in L-shaped pattern below and behind eye, with six pores emanating from ventral branch and none from ascending branch.

Parasphenoid wing low, with short posterior ramus, not reaching mid-height of trigeminofacialis foramen; frontal and parasphenoid not separated by pterosphenoid (Fig. 2A). Ethmoid cartilage extensive, protruding well into orbital fenestra. Sphenotic and parietal separated by pterotic and frontal. Anterior portion of pterotic wider than posterior portion, unlike other zoarcids, overlapping parietal somewhat (Fig. 2B). Supraoccipital moderate, narrowly contacting exoccipital posteriorly, with low mesial crest. Pa-

rietals not meeting in midline. Single, very small lateral extrascapular.

Palatal (pterygoid) arch well developed, ectopterygoid and mesopterygoid broadly articulating with quadrate, covering more than half its anterior dorsal surfaces (Fig. 3). Metapterygoid relatively large. Hyomandibular rami not elongate. Mandibular and preopercular lateralis canals joined, pores emanating from troughs in dentary and preopercle (Fig. 3).

Hyoid bar somewhat elongate (Fig. 4A). Ceratohyal–epihyal juncture smooth. Branchiostegal rays six: four articulating with ceratohyal, two with epihyal; first and second rays articulating on inner surface of ceratohyal. Urohyal thin, surfaces smooth, weakly ossified posteriorly. Hypohyals well ossified, dorsalmost reduced in size.

Branchial basket relatively well ossified; fourth basibranchial a cartilaginous pad (Fig. 5A). Ceratobranchial five (lower pharyngeal) dentate, teeth in single row. Three pairs of infrapharyngobranchials and tooth plates (upper pharyngeals) present, corresponding to gill arches two to four. One to three gill rakers on first epibranchial, seven to nine on first ceratobranchial, none on hypobranchials.

Pectoral girdle moderately reduced (Fig. 6A). Posttemporal ventral ramus weak or absent. Supracleithrum with very weak posteriorly directed dorsal ramus, and no cartilaginous lamina. Scapular foramen enclosed; scapular posterior ramus well developed. Four actinosts present bearing 17–19 pectoral fin rays; dorsalmost two rays articulating with cartilaginous lamina opposite scapular ramus. Three pelvic fin rays, distalmost about half as long as other two. Postcleithrum a reduced, curved splint.

Epipleural ribs on vertebrae 1–17. Pleural ribs on fourth to ultimate precaudal vertebrae. Dorsal

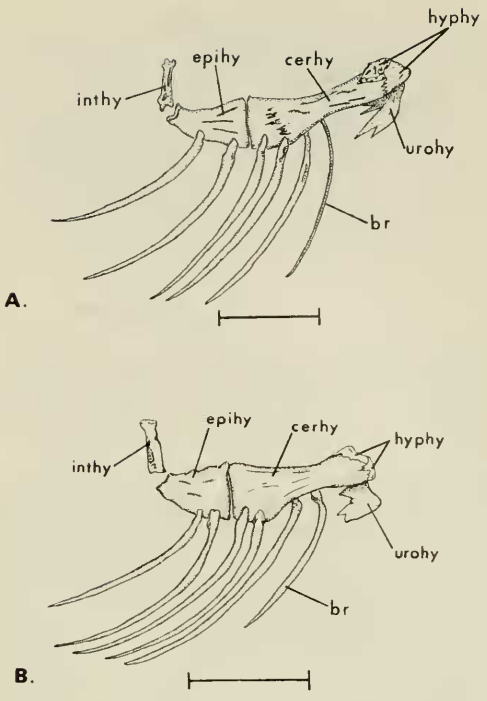

FIGURE 4. Right hyoid bar of: A) *Plesienchelys stehmanni*, ISH 249/78, lateral view; space bar = 3 mm; B) *Letholycus microphthalmus*, ISH 376/78, lateral view; bar = 2 mm.

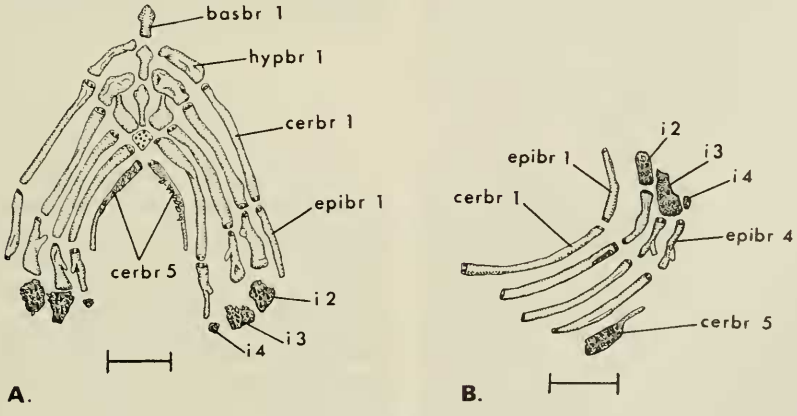

FIGURE 5. Gill arch bones of: A) *Plesienchelys stehmanni*, ISH 249/78, dorsal view, epibranchials and upper pharyngeals pulled 180° posterior to position in vivo; bar = 3 mm; B) *Letholycus microphthalmus*, ISH 376/78, anteromesial view of right elements, epibranchials and upper pharyngeals pulled 90° posterior to position in vivo; bar = 2 mm.

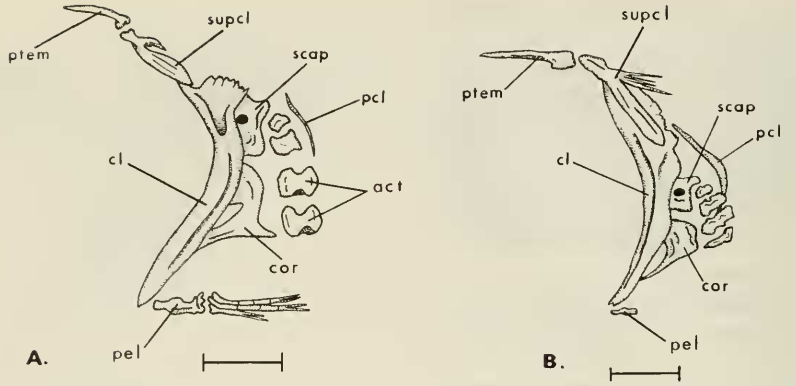

FIGURE 6. Left pectoral girdle of: A) *Plesienchelys stehmanni*, ISH 249/78, lateral view; space bar = 3 mm; B) *Letholycus microphthalmus*, ISH 249/78, lateral view; bar = 2 mm.

fin origin associated with vertebrae six to eight, with no free pterygiophores. All dorsal fin elements soft rays; first bilaterally divided near base, although unsegmented and unbranched. Last dorsal ray associated with fourth preural vertebra. Anal fin origin associated with last precaudal vertebra, with four to five ray-bearing pterygiophores inserted anterior to haemal spine of first caudal vertebra. All anal fin elements soft rays (all segmented); last anal ray associated with second preural vertebra. Caudal fin rays nine to ten, with two epural, four upper hypural, and three to four lower hypural rays.

Palatine membrane (oral valve) weak, not reaching anterior margin of vomer. Pseudobranch filaments one to five (usually three to four), relatively short. Pyloric caeca absent.

Dorsal part of head uniformly chocolate brown; dorsal part of trunk with brown mottling extending to body midline. Flesh dull white ventrally including head. Posterior caudal region uniformly brown dorsally, uniformly dull white below. Abdomen and eye dark blue. Lining of orobranchial chamber pale.

REMARKS.—Anderson (1984) characterized *Plesienchelys stehmanni* as the primitive sister taxon to all other lycenchelyine eelpouts. These fishes, comprising 11 genera and about 70 species, are separable from all other eelpouts by two important, correlated characters: a great slenderization of the body and an elongation of the tail. In all lycenchelyines except *Plesienchelys*, the tail does not sharply taper posteriad; its height is about the same at two-thirds its length posteriorly as at the anal fin origin. In *Plesienchelys*, the shape of the tail is unique: it rapidly and evenly tapers to its tip, giving specimens the appearance of a marlin spike. The more specialized lycenchelyines are also characterized by a vertebral increase (chiefly caudal vertebrae, further elongating the tail), a head pore enlargement (with some reversal in this character), and a palatal arch reduction with the endopterygoid and mesopterygoid not overlapping half the anterior and dorsal surfaces of the quadrate. *Plesienchelys* has retained the plesiomorphic states of all these characters in having relatively few vertebrae, very small pores, and a strongly ossified palatal arch. Despite the large number of plesiomorphic states in most bone systems, the new genus is characterized by two autapomorphies: the sharply attenuated tail and the anteriorly expanded pterotic bones (Fig. 2B). The genus further differs from *Ophthalmolycus* Regan, 1913, by its troughlike passage of the preoperculomandibular canal through the dentary and preopercle.

Letholycus gen. nov.

TYPE SPECIES.—*Melanostigma microphthalmus* Norman, 1937.

DIAGNOSIS.—A lycenchelyine zoarcid as defined by Anderson (1984) with body slender, tail relatively elongate; suborbital bones four to five; gill slit above pectoral fin base, or extending ventrally to mid-pectoral base; palatal arch reduced, with ectopterygoid and mesopterygoid not overlapping half anterior and dorsal surfaces of quadrate; vertebrae 24–27 + 67–75 = 93–101; pelvic fins absent; pectoral fin rays 9–14.

ETYMOLOGY.—From the Greek λήθη, a forgetting, and λύκώδης, wolflike (after *Lycodes*), a commonly used suffix for southern

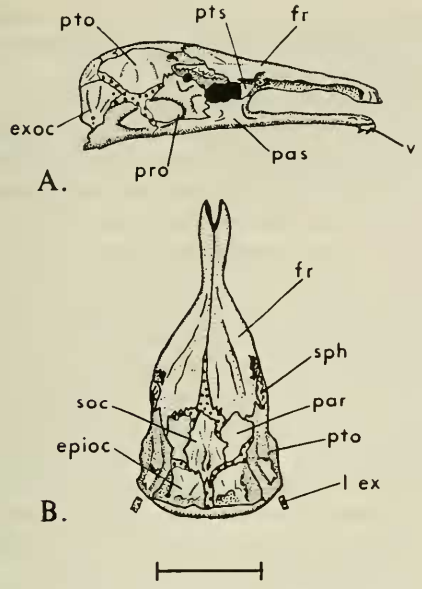

FIGURE 7. Neurocranium of *Letholycus microphthalmus*, ISH 376/78, partially reconstructed, ethmoid region removed: A) right lateral view; B) dorsal view, left side reconstructed. Bar = 2 mm.

hemisphere eelpout genera (*Ophthalmolycus, Austrolycus*, etc.). Named in reference to the distinctive, yet previously unobserved, anatomy of the species. Gender: masculine.

REMARKS.—The two species comprising the new genus differ from *Maynea* Cunningham in having only four to five suborbital bones (six in *Maynea*), normal hyomandibular rami (posterior ramus elongate in *Maynea* and relatives), smooth ceratohyal–epihyal juncture (bone interdigitating at juncture in *Maynea* and relatives), parietals not meeting in the midline (meeting in *Maynea*), and six branchiostegal rays (five in *Maynea*; Anderson, 1988: fig. 1–3).

Letholycus microphthalmus (Norman, 1937)

(Fig. 1B, 4B, 5B, 6B, 7, 8)

Melanostigma microphthalmus Norman, 1937:110, fig. 58.
Maynea microphthalmus (Norman). McAllister and Rees, 1964: 106–107, app.
Maynea microphthalma (Norman). Gosztonyi, 1977:223–224, fig. 12.

MATERIAL EXAMINED.—BMNH 1936.8.26:1047 (holotype; 83 mm SL); south of Falkland Isls. (52°40'S, 58°30'W), WILLIAM SCORESBY (WS) sta. 248; 210–242 m; 20 July 1928. BMNH 1936.8.26: 1046 (paratype; 69 mm); south of Falkland Isls. (52°25'S, 61°00'W); WS sta. 246, 267–208 m; 19 July 1928. ISH 376/78 (1; 90 mm, head partially cleared and stained); Argentine slope (45°59.3'S, 59°57.1'W); WALTHER HERWIG sta. 531/78; 580 m; 15 May 1978. LACM 10062-1 (1; 45 mm); off Cape Horn (55°47'S, 66°17'W); ELTANIN sta. 219; 115 m; 23 Sept. 1962. ZIL 39894 (1; 42 mm); Argentine slope (45°16'S, 54°54'W); OB' sta. 479; 680 m; 16 June 1978. ZIL 43285 (1; 56 mm); Argentine slope (47°17'S, 59°54'W); ZUND sta. 128; 750 m; 18 May 1974. ZIL 41568 (12; 38.5–75 mm); east of Falkland Isls. (51°57'S, 57°37'W); AKAD. KURCHATOV sta. 930; 401 m; 18 Dec. 1971.

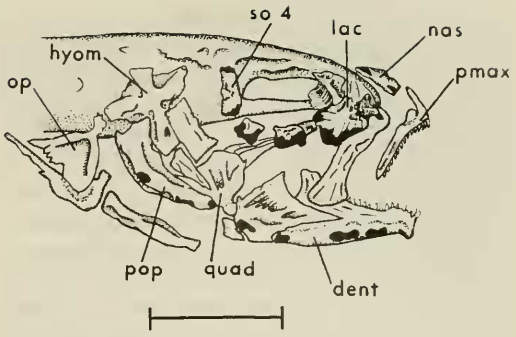

FIGURE 8. Jaws, suspensorium, opercular, and suborbital bones of *Letholycus microphthalmus*, ISH 376/78, right lateral view. Bar = 3 mm.

COUNTS AND MEASUREMENTS.—Vertebrae 24–27 + 67–77 = 94–101; D 91–96; A 69–79; C 6–8; P1 9–10; P2 absent; vomerine teeth two to five; palatine teeth 6–12; gill rakers 1–2 + 7–9 = 8–11; branchiostegal rays six (seven); pseupdobranch filaments two; pyloric caeca two. Following measurements in percent SL: head length 12.7–18.4; head width 5.8–7.2; pectoral fin length 3.8–7.2; predorsal length 15.6–18.7; preanal length 37.0–43.6; body height 6.5–7.6; caudal fin length 1.5–2.4. Following measurements in percent HL: head width 35.9–47.4; upper jaw length 29.6–36.5; pectoral fin length 29.8–52.1; snout length 17.5–26.3; eye diameter 18.4–26.0; gill slit length 15.8–17.6; interorbital width 9.9–12.5. Pectoral base/length ratio 29.4–35.9.

DIAGNOSIS.—Preoperculomandibular pores six to seven; suborbital pores four to five; postorbital pores two; occipital pore absent; pectoral fin rays 9–10; dorsal fin origin associated with vertebrae four to five; body lateral line mediolateral, extending posteriorly to just behind vertical through anal fin origin; gill opening above pectoral base; pectoral base/length ratio 29.4–35.9.

DESCRIPTION.—Head relatively short, bluntly rounded anteriorly; ventral profile very gently curved. Body relatively short, ovoid in cross section; profile not tapering posteriorly. Tail laterally compressed, especially posteriorly; anterior region of tail not tapering. Skin moderately firm, thin, with slight, subdermal gelatinous layer about abdomen. Lateral line mediolateral, neuromasts traced in two specimens along body to less than half head length posterior to vertical through anal fin origin. Scales minute, cycloid, imbedded, extending anteriorly on tail to vertical through first

third of its length; scales scattered anteriorly, not forming wedge-shaped pattern; no scales on vertical fins. Young juvenile (LACM 10062-1) without scales. Eye relatively small, rounded. Gill opening vertical ventrally, without posteriorly directed flap or siphonal fold; entirely above pectoral base. Single pair of nostrils at snout tip, nasal tube extremely long, overlapping and extending beyond upper lip to terminate about middle of lower lip (Norman 1937, fig. 58). Pectoral fin evenly rounded posteriorly, relatively small, origin well below body midline, insertion on ventral surface of abdomen; all rays excised at tips, ventralmost more so than dorsalmost; ventral rays thickened. Pectoral fin of 45-mm juvenile (LACM 10062-1) incompletely developed: its length 29.8% HL (44.8–52.1% HL in others); only four rays formed (others with 9–10 rays).

Mouth relatively small, terminal; sexual dimorphism in upper jaw lengths not detected due to small sample size ($n = 18$). Teeth in jaws and palate small, conical, in single row in dentary and premaxilla.

Cephalic lateralis pore system reduced numerically, pores enlarged. Two pair of nasal pores, located just anteromesial and posteromesial to nasal tube. First and fourth postorbital pores present, emanating from frontals (first) and lateral extrascapulars (fourth). Interorbital and occipital (supratemporal) pores absent, no supratemporal commissure across parietals. Preoperculomandibular canal with three (four in ISH 376/78) dentary, one anguloarticular, and two (ventral and middle) preopercular pores. Four (five in ISH 376/78) suborbital pores emanating from or between two or three of the four suborbital bones.

Parasphenoid wing wide, entirely below trigeminofacialis foramen; frontal and parasphenoid not separated by pterosphenoid (Fig. 7A). Sphenotic and parietal separated by frontal and pterotic (Fig. 7B). Pterotic broadest at midlength, anteriorly containing tubular passage of postorbital canal; this exits posteriorly through raised tube on surface of bone. Supraoccipital relatively large, separated from exoccipital by epioccipitals, with very low, mesial crest. Parietals not meeting in midline. Single, very small, lateral extrascapular.

Palatal (pterygoid) arch weak, ectopterygoid and mesopterygoid contacting less than half dorsal and anterior surfaces of quadrate (Fig. 8). Metapterygoid relatively large. Hyomandibula rami not elongate. Mandibular and preopercular lateralis canals joined.

Hyoid bar well ossified, not elongate (Fig. 4B). Ceratohyal–epihyal juncture smooth. Branchiostegal rays six: four articulating with ceratohyal (LACM 10062-1 with four on one side, five on the other), two with epihyal; first and second rays articulating on ventral edge of ceratohyal. Urohyal thin, surfaces smooth, weakly ossified posteriorly, anterior edge bowed forward. Hypohyals well ossified, neither reduced in size.

Branchial basket well ossified; fourth basibranchial a cartilaginous pad. Ceratobranchial five (lower pharyngeals) dentate, teeth in two irregular rows (Fig. 5B). Three pair of infrapharyngobranchials and tooth plates (upper pharyngeals) present. One or two gill rakers on first epibranchial, seven to nine on first ceratobranchial, none on hypobranchials.

Pectoral girdle moderately reduced (Fig. 6B). Posttemporal ventral ramus absent. Supracleithrum with weak, thinly ossified dorsal ramus and no cartilaginous lamina. Scapular foramen enclosed; scapular posterior ramus well developed. Four actinosts present, bearing pectoral fin rays on cartilaginous lamina opposite actinosts (no rays opposite scapula). Pelvic fin rays absent, pelvic bone reduced. Postcleithrum long, well ossified.

Epipleural ribs on vertebrae 1–16. Pleural ribs on third or fourth through ultimate or penultimate precaudal vertebrae. Dorsal fin origin associated with vertebrae four or five, with no free pterygiophores. All dorsal fin elements soft rays, first not segmented, but bilaterally divided near base. Last dorsal ray associated with second or fourth preural vertebra. Anal fin origin associated with last precaudal vertebra or first caudal vertebra, with zero to three ray-bearing pterygiophores inserted anterior to haemal spine of first caudal vertebra. All anal fin elements soft rays (all segmented); last anal ray associated with second or third preural vertebra. Caudal fin rays six to eight, with one or two epural, two or three upper hypural, and three lower hypural rays.

Palatine membrane (oral valve) well developed, reaching anterior edge of vomer. Two small pseudobranch filaments. Pyloric caeca two small nubs, more regressed in one specimen than others. One gravid female (ZIL 41568, 59 mm) with only four ova measuring 3.1–4.1 mm in diameter.

Dorsal surface of head and body uniformly reddish brown; body mottled ventrally and posteriorly, especially below midline. Ventrally, background color blue in ISH 376/78, but Norman (1937) noted it to be "pale yellowish white" in holotype (in alcohol), a smaller specimen. Fins yellowish. Lining of orobranchial cavity pale.

Letholycus magellanicus sp. nov.

(Fig. 1C)

HOLOTYPE.—ISH 164/78 (144 mm SL); Argentine slope (45°59.3'S, 59°57.1'W); WH sta. 531/78; 580 m; 15 May1978.

PARATYPE.—ISH 173/78 (150 mm SL); Argentine slope (45°54.7'S, 59°43.9'W); WH sta. 533/78; 900 m; 15 May 1978.

COUNTS AND MEASUREMENTS.—Vertebrae 27 + 73–74 = 100–101; D 95–96; A 75–76; C 7; P1 13–14; P2 absent; vomerine teeth four to six; palatine teeth five to six; premaxillary teeth 10–15; dentary teeth 12–16; gill rakers 2 + 7 = 9; branchiostegal rays six; pseudobranch filaments two; pyloric caeca two. Following measurements in percent SL: head length 14.7–15.1; head width 5.3–6.4; pectoral fin length 6.5–6.7; predorsal length 16.9; preanal length 38.1–38.7; body height 8.8–9.2; caudal fin length 1.3–1.4. Following measurements in percent HL: head width 36.0–42.3; upper jaw length 39.6–42.2; pectoral fin length 44.0–44.1; snout length 22.7–23.1; eye diameter 21.1–21.3; gill slit length 32.2–35.1; interorbital width 9.5–9.7. Pectoral base/length ratio 51.6–56.0.

DIAGNOSIS.—Preoperculomandibular pores eight; suborbital pores five to six; postorbital pores three; mesial occipital pore present; pectoral fin rays 13–14; dorsal fin origin associated with third vertebra; body lateral line mediolateral, extending to tail tip; gill opening extending ventrally to lower edge of pectoral base or slightly above; pectoral base/length ratio 51.6–56.0.

DESCRIPTION.—Head relatively short, bluntly rounded anteriorly; ventral profile gently curved. Body moderately elongate, ovoid in cross section; profile not tapering posteriorly. Tail laterally compressed, especially posteriorly. Skin firm, moderately thickened, with slight, subdermal gelatinous layer about abdomen. Lateral line mediolateral, its origin just posterior to fourth postorbital pore, neuromasts extending to tail tip; lateral line coursing in straight line across abdomen. Scales minute, cycloid, imbedded, extending anteriorly to dorsal fin origin; in wedge-shaped pattern on dorsum, absent on abdomen, head, and pectoral base; scales present on vertical fins to about half their height posteriorly, less anteriorly (scales absent on anterior eighth of anal fin). Eyes moderately large, rounded. Gill opening bowed ventrally, with slight, posteriorly directed flap; extending to lower edge of pectoral base or to opposite pectoral rays 10–12. Single pair of nostrils at snout tip, nasal tube overlapping upper lip, but not extending beyond it. Pectoral fin evenly rounded posteriorly, moderately large, origin just below body midline, insertion on ventral surface of abdomen; all rays excised at tips, ventralmost more so than dorsalmost; ventral rays thickened.

Mouth moderately large, terminal. Teeth in jaws small, conical, in two short, irregular rows anteriorly, blending into single, posterior row. Teeth in palate larger, in patch on vomer and single row on palatine bone.

Cephalic lateralis pore system somewhat reduced numerically, pore enlarged, rounded. Two pairs of nasal pores, located just anteromesial and posteromesial nasal tube. First, third, and fourth postorbital pores present, emanating from frontals (first), pterotics (third), and lateral extrascapulars (fourth). Interorbital pore absent. Single, mesial occipital (supratemporal) pore present, supratemporal commissure complete across parietals. Preoperculomandibular canal with four dentary, one anguloarticular, and three preopercular pores. Five suborbital pores emanating from ventral branch of bone chain, paratype with a sixth from ascending branch just ventral to first postorbital pore.

Limited osteological observations made from radiographs and superficial dissection. Sphenotic and parietal separated by frontal and pterotic. Pterotic broadest at midlength, containing tubular passage for postorbital canal anteriorly. Supraoccipital moderately large, separated from exoccipital by epioccipitals. Parietals not meeting in midline. Single lateral extrascapular. Palatal arch weak, ectopterygoid and mesopterygoid contacting less than half dorsal and anterior surfaces of quadrate. Mandibular and preopercular lateralis canals joined. Ceratohyal–epihyal juncture smooth. Branchiostegal rays six: four articulating with ceratohyal, two with epihyal. Ceratobranchial five dentate. Three pair of infrapharyngobranchials present. Four actinosts bearing pectoral rays. Pelvic fins absent. Postcleithrum present. Dorsal fin origin associated with third vertebra, with no free pterygiophores. All dorsal fin elements soft rays, first not segmented, but bilaterally divided near base, remainder segmented. Last dorsal ray associated with third preural vertebra. Anal fin origin associated with last precaudal vertebra, with three or four ray-bearing pterygiophores inserted anterior to haemal spine of first caudal vertebra. All anal fin

elements soft rays; last anal ray associated with second preural vertebra. Caudal fin rays seven, with one epural, three upper hypural, and three lower hypural rays.

Palatine membrane weak; very slight fold anteriorly, not reaching vomer. Two small pseudobranch filaments. Pyloric caeca two small nubs.

Dorsal surface of head, body, and tail reddish brown; tail mottled with reddish brown ventrally on blue background. Abdomen, ventral surface of head, and eye blue. Fins reddish brown. Lining of orobranchial chamber dark brown.

Etymology.—Named after zoogeographic Magellan Province (Regan 1914; Briggs 1974), to which this species is presumably endemic. Province named honoring Spanish explorer Ferdinand Magellan, first European to visit these waters.

Literature Cited

Anderson, M. E. 1982. Revision of the fish genera *Gymnelus* Reinhardt and *Gymnelopsis* Soldatov (Zoarcidae), with two new species and comparative osteology of *Gymnelus viridis*. Natl. Mus. Nat. Sci., Publ. Zool. 17:1–76.

———. 1984. On the anatomy and phylogeny of the Zoarcidae (Teleostei: Perciformes). Ph.D. Dissertation, College of William and Mary, Williamsburg, Virginia. 254 pp.

———. In press. 1988. Studies on the Zoarcidae (Teleostei: Perciformes) of the southern hemisphere. I. Ant. Res. Ser., Amer. Geo. Phys. Union. The Antarctic and subantarctic regions.

———. 1988. A new genus of California eelpout (Teleostei: Zoarcidae) based on *Maynea californica* Starks and Mann, 1911. Proc. California Acad. Sci. 45(5):89–96.

Briggs, J. C. 1974. Marine zoogeography. McGraw Hill, New York. 475 pp.

Cunningham, R. O. 1871. Notes on the reptiles, amphibia, fishes, mollusca and crustacea obtained during the voyage of H.M.S. "Nassau" in the years 1866–69. Trans. Roy. Soc. London 27(4):455–502.

Dingerkus, G. and L. D. Uhler. 1977. Enzyme clearing of alcian blue stained whole small vertebrates for demonstration of cartilage. Stain Tech. 52(4):229–232.

Gosztonyi, A. E. 1977. Results of the research cruises of FRV "Walther Herwig" to South America. XLVIII. Revision of the South American Zoarcidae (Osteichthyes, Blennioidei) with the description of three new genera and five new species. Arch. Fischereiss. 27(3):191–249.

Günther, A. 1880. Report on the shore fishes procured during the voyage of H.M.S. "Challenger" in the years 1873–1876. Rep. Sci. Res. Challenger 1(6):1–82.

Leviton, A. E., R. H. Gibbs, Jr., E. Heal and C. E. Dawson. 1985. Standards in herpetology and ichthyology: part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia 1985(3):802–832.

McAllister, D. E. and E. I. S. Rees. 1964. A revision of the eelpout genus *Melanostigma*, with a new genus and with comments on *Maynea*. Bull. Nat. Mus. Canada 199:85–109.

Norman, J. R. 1937. Coast fishes, part II. The Patagonian region. Discovery Rep. 16:1–130.

Regan, C. T. 1913. The Antarctic fishes of the Scottish National Antarctic Expedition. Trans. Roy. Soc. Edinburgh 49(2): 229–292.

———. 1914. Fishes. Brit. Antarct. ("Terra Nova") Exped., 1910. Nat. Hist. Rept., Zool. 1(1):1–54.

CALIFORNIA ACADEMY OF SCIENCES
Golden Gate Park
San Francisco, California 94118